



**The SOUTH AUSTRALIAN SOCIETY of MODEL
and EXPERIMENTAL ENGINEERS INC.**

"SASMEE PARK", SASMEE Lane (off Millswood Crescent) Millswood, SA

PO Box 208, Goodwood, SA, 5034

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Model & Experimental Engineers Inc.**

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EDITORIAL.

This Bulletin's cover features Kingsley Martin's NSU locomotive, first prize at the 2017 Royal Show. The NSU was one of the first narrow gauge diesel electric locomotives to operate in Australia.

Communication.

Email Protocols

A reminder that when you join SASMEE you are obliged to abide by the conditions laid out in the Constitution. These conditions include treating each other with courtesy and respect. This extends to email communication. While it is healthy to have disagreements and robust debate, it is not acceptable to denigrate other members or their opinions.

Addressing emails is also important. If there is something to go to the Committee or an individual, please address it as such. Sending an email to the General Member's address can bombard members with a lot of unnecessary spam.

So – Please think before you press Send!

History

Some dates of interest:

- November 1944. Meeting night changed from Wednesday to 3rd Tuesday of month to enable meetings to transfer to new W.E.A hall, Twin St. Adelaide.
- August 1948. Clubhouse foundations finished.
- November 1948. Clubhouse erected from 2nd hand materials from fowl house.
- January 1949. First meeting held in the SASMEE clubhouse on dirt floor with one light from 12v battery.
- October 1950. Track almost ready to erect on concrete pillars.
- September 1954. Discussion held on type of car track to be laid at SASMEE.
- November 1958. Boat pond completed. (*this information conflicts with previous documents. If anyone can confirm the correct date, please let me know. Ed*)

- April 1965. Extended elevated track opened on additional acquired land from SAR.
- March 1970. Annual AALS Convention was held at SASMEE.
- August 1974. Introduction of further Public Field Day. First Sunday in month.
- March 1976. The Wadlow Steam engine arrived in dismantled condition.
- April 1977. The last AALS Convention to be held at SASMEE.
- November 1977. STA agreed western boundary fence be re-aligned for 7 1/4G track.
- June 1981. 7 1/4G turntable was constructed.
- August 1983. 7 1/4G track opened for public running.
- June 1986. Gate charges increased. Adult \$1.50 Child \$1.00.
- August 1987. Resolved that club spend up to \$20,000 on new canteen & clubhouse.
- November 1992. Elevated track placed on ground within 3 wks. No Public Field Days lost.
- September 1999. Town & Country Drilling sunk bore to service boat pond & grounds.



Clubhouse, Car Track and raised 2 ½, 3 ½ and 5-inch tracks.

PRESIDENT'S REPORT.

Bryan Homann

Firstly, I thank the committee members who completed their terms at the August AGM. The work of committee members has proved to be very onerous, not only due to the Covid pandemic, but simply because managing any incorporated body has become more and more demanding over the years.

I also thank the on-going, and new committee members for their dedication to SASMEE.

As mentioned in the annual report, we have started to re-open to the public. So far, this has proved to be both demanding, and rewarding, with very close to maximum numbers happening every field day. Having said that, it has required much more involvement by members to successfully open each field day, and we all appreciate that effort, and trust that it will be on-going.

Probably the biggest hurdle has been getting the public to socially distance, but the Marshals seem to have improved this. Devising suitable carriage arrangements has generated several interesting options, a process that is continuing.

As part of the Covid re-opening SASMEE has been using an on-line booking system. After a few introductory issues, it is now settling down. However, because of the commitments made by patrons to this system, there has been a significant increase in the number of emails and phone calls relating to wet weather forecasts. Probably, in the past, these potential patrons would simply not have turned up. Therefore, the committee has agreed on a severe weather policy which will be placed on the website and other social platforms such as Facebook. Once the wording is finalised, this will also be provided to all members.

There have been some issues relating to excessive smoke from locomotives. The committee is considering training sessions in order to explain some of the intricacies of combustion, and test various methods of firing the fuels available to us.

Continuing close inspection of our public liability insurance has highlighted some issues with practice of allowing non-SASMEE members to operate locomotive hauling the general public. As our public Liability insurance is due for renewal in February 2021, this topic is of high priority.

Over the October long weekend, I had the pleasure of visiting the Port Augusta Model Engineers at their new site on Power Station Road. They have had a hard row to hoe in the last two years. Their previous location (for many years) was sold for development by the Council, with significant promises of relocation assistance. While there was certainly financial assistance, all the shovel work ended up having to be done by their small band of volunteers. That they have achieved a basically operational layout is testament to their endurance. I and other members of SASMEE and AMSRS were the guinea pigs for the first serious trials. While, not surprisingly there were some issues, the weekend was a happy one for all concerned, and we look forward to an even better time in 2021, hopefully with some more of our members making the trip northward. Not only did they turn on a variety of weathers (hot and windy, to rain deluge), their very capable catering members made sure the guinea pigs were very well fed.

Talking about being well fed, several of our field day members had a barbecue put on for them by the canteen staff at our long weekend field day.

A final reminder that our annual Christmas get together on December 19 this year includes the Annual Show of Work. While brought about by Covid restrictions, I see this as a great opportunity for more members to bring the fruits of their lock-down labours along for us to admire. Having all afternoon allotted for this purpose will give much more time to look, and seek out exhibitors to share ideas and modelling tips. I look forward to it being a really interesting day. More specific details appear elsewhere in the Bulletin.

Bryan

For Sale

24-volt Invacare Wheel chair Motor with Gearbox and Electric Brake.

Dimensions: Length of Motor 215mm. Length of Gearbox 125mm. Diameter of Motor 90mm. Width of Gearbox 125mm. Drive Shaft 19mm diameter. Asking price \$50. .

7.25" G Passenger Riding Car.

Two metres long with sprung bogies. Load tested with five adult males. Steel wheels machined to AALS standards. Axles run on sealed NSK ball races.



Professionally upholstered. Brakes can be either steam or air operated

Asking price \$2,000.

MAMOD COLLECTORS – all items in EC, boxed or plastic packaged.

SL3 cab rear walls x 2 maroon @ \$20 each

MR grey closed wagons x 2 @ \$100 each

Red passenger coach \$100

Brown brake van \$100

G-scale 45mm gauge – all items New in Box, only opened to inspect, unrun

Bachmann Spectrum Model 82597, 0-4-0 side tank Porter loco, DCC ready \$290

Bachmann Big Hauler Model 92502 side dump ore cars x 2, \$100 each

Used bogie passenger coach, dark blue & black, plastic wheels, \$75

Payment by PayPal or EFT please. Well-packed postage additional at cost.

IN THE LIBRARY

Max Shuard

Book of the Month

“Air Engines.” Theodor Finkelstein and Allan Organ. When I picked up this book, I didn’t really know what to expect. It turned out to be a treatise on the hot air engine. Starting with Stirling’s original invention in 1818 and tracing the history to the present-day including GM’s multicylinder bus engine. There are many side stories about other inventors and their type of engines. The main advantages of this type of engine are its extreme simplicity and that it will use almost any fuel. While the engine has had many applications, from powering water pumps in poor and remote areas, to powering battery generators in space craft, it has never been a large-scale commercial success. The book is challenging in places as it explores the theory and maths behind the principle. And it leaves the main question unanswered – with the pressure on fossil fuels and carbon emissions are we on the threshold of a resurgence of this type of engine, or is it a technological dead end. But, if you are at all thermodynamically inclined, this is a fascinating read.

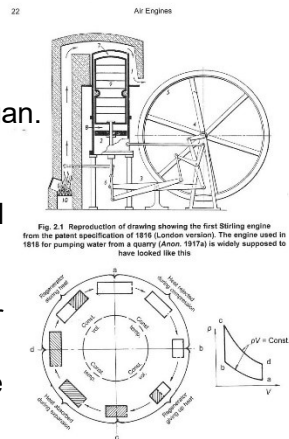


Fig. 2.2 The principle of operation for the Stirling cycle is shown here with reference to an indicator (p-v) diagram.

Magazines

There is a real problem with the supply of the English magazines. Spoke to the publisher and there are a number of concerns.

Some Model Boats were not published. Model Engineer and Model Engineer’s Workshop have been sent but not received.

April was the last time we have received a regular shipment. It appears a number are missing in transit. The plan is to wait until the end of the year and see what gaps there are in and either buy back copies or get electronic versions of the ones out of stock.

So, if you have bought any of these magazines in the last few months, please don’t throw them out. We may need them.

Communication.

As well as books and magazines, stored in the library are:

- Quartering jig for 3½ “and 5 “wheel sets,
- 5” wagon bogie frames for sale at \$120 for a set of four side frames and two bolsters.
- Whistle boards if any are needed on the track,

Even though we cannot meet at the clubrooms, the library is open from 7:00 to 7:45 on General Meeting nights. Also, I generally attend the public run days and Wednesday working bees, so if you are looking for something, please just ask.

Just a thought: Workshop hint: When all else fails – try percussion!

TECHNICAL MATTERS

HOW A DEAD-END DISPLACEMENT LUBRICATOR WORKS

Allan Wallace

This is a continuation of the article published in the August Bulletin (Ed)

Part 2 - Some theory

The above is all one really needs to know in order to use a dead-headed displacement lubricator. However, for those interested in drilling down further into the theory I’ll describe a mathematical model and discuss what it can tell us.

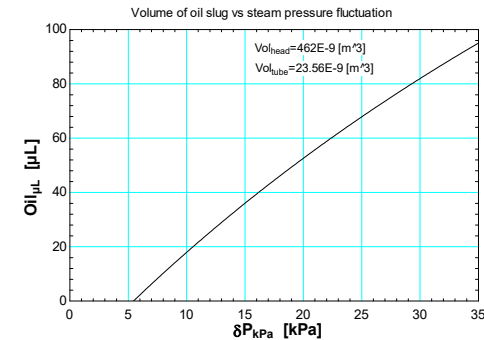
A mathematical model can be used to predict outcomes given a set of inputs. In this case, let’s see how the oil delivery rate might be affected by, say, the length of the connecting pipe. We would call this the “independent variable”. There are many other variables affecting the answer, and in true scientific fashion we have to hold these constant. It’s simple to hold, say, the connecting tube diameter constant, but others may be poorly defined and they must also be fixed.

For instance, the volume of the slug of oil delivered after a downward fluctuation of steam pressure will depend on the size of the pressure fluctuation. When we want to see the effect of changing connecting pipe length and nothing else, we have to nominate a pressure fluctuation magnitude.

What about the effect of the frequency of the pressure fluctuations? That can be held constant too, but often modellers will strategically choose certain assumptions to make the model simpler. In this case I will avoid all the complications of transient (time-dependant) responses by adopting the quasi-static case. Our pressure fluctuation can be treated as a single step up, followed by the same step down, with a pause in between so that the system goes from equilibrium states D to F to G in the above sequence. This cycle leads to a defined and calculable slug of oil delivery. We now have a useful way to quantitatively compare the effects of changing any of the input variables.

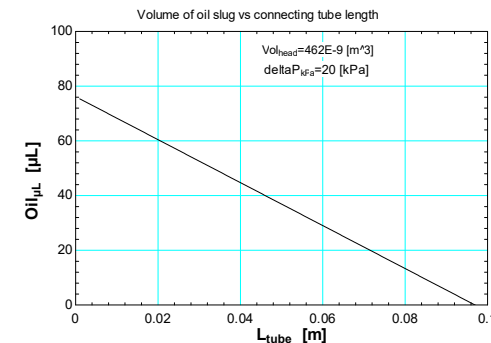
I can spare you from the equations by talking through the calculation steps. Starting from state D, the up step of steam pipe pressure pushes a pipe-full of oil back into the reservoir, and then proceeds to add condensed steam to the body until the air is compressed by the amount of our pressure step. The volume of water added equals the volume reduction of the air, and if we assume isothermal conditions, we can calculate the exact volume from the properties of air. Actually, we have now done the calculation, because when the pressure steps down again the air acts like a spring and delivers that same volume of oil into the pipe. The pipe must fill with oil before any is released into the steam pipe, but the accounting ensures that the delivered oil volume equals the change in water volume between states D and G.

Let's see how the delivered oil volume varies with the size of the pressure step, before we return to the original question about the length of the connecting pipe. The delivered oil is in microlitres and plotted against the pressure step magnitude.



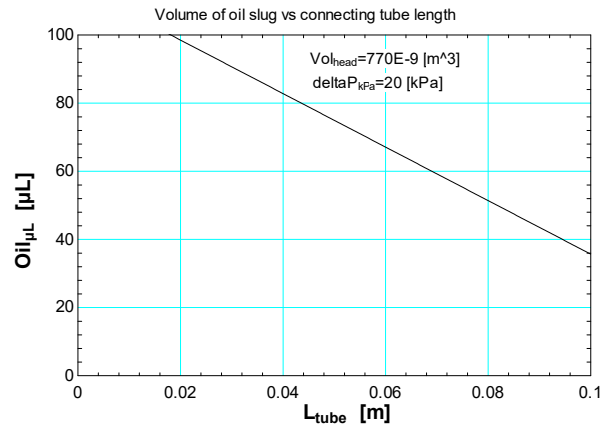
The quasi-static model indicates that the volume of the delivered oil increases with the magnitude of a pressure fluctuation, which is intuitive. However, why does the above plot not pass through the origin? The model has detected that when the pressure rise from state D is below about 5.5 kPa in this example, the steam never makes it all the way through the pipe. Before all the oil in the pipe is pushed back into the lubricator, the air pressure has built up enough to balance the steam pressure, so no more flow occurs. The fix is easy: increase the air space, or reduce the pipe volume. The above plot is moved to the left as the connecting pipe gets shorter, and moved upwards as the air space gets larger. The applicable volumes for the air space and connecting pipe are shown on the plot.

Now let's nominate a fixed pressure step size of 20 kPa, and explore what happens to the oil slug volume as the pipe length varies.



This illustrates the reduced delivered volume as the pipe gets longer, because the oil being pushed back from the pipe to the lubricator is pressurising the air further before the steam enters the air space.

Progressively less water can condense before the air is compressed enough to balance the steam pressure. Eventually, as the pipe reaches 97 mm long, no more oil is delivered from this pressure step. Again, the fix is to increase the air space, as illustrated in the plot below where the air space has been increased 40%.



This is just a small taste of the power of a mathematical model to study a fluid system. Not only can it help us to understand the operation, but it can help to diagnose problems that otherwise would be left to intuition and guesswork.

A key problem however lies in determining appropriate input values. The above analysis adopted a pressure fluctuation of 20 kPa (3 psi) and it was sustained to give time for the system to equilibrate. A real system will be subjected to pressure fluctuations ranging from zero to boiler pressure, and at frequencies starting from static, up to pulsations at multiples of engine speed. Despite the availability of a wonderful analysis tool, in practice it mostly comes back to suck-it-and-see in our models. There's a time to value what theory can teach us because it can guide our experimental efforts and make us question our assumptions, but there's also a time to be practical!

IN THE WORKSHOP

DISTRIBUTOR WOES.

Article by Bill Coles.

For the past 3 years I have been working on a 32cc V four IC engine. The design is by Jerry Howell. The engine is fairly complex but is aided by 65 A4 pages of very detailed CAD drawn components. Processing the items from the solid had its moments but basically it was a demanding machining exercise. The moment arrived when it could be spun over with a healthy compression. This in itself posed a problem as the power starter [an electric drill] spun the flywheel nut undone. This problem took some solving without the use of Loctite. Little did I know that worse was to come.

The ignition system required a distributor. The body is 1.05" [26mm] in diameter by 1.5" [38mm] in height. It is driven by a 15 tooth by 48 Dp bevel gear from one of the 2 cam shafts.

I purchased the plastic distributor cap from o/seas. Counting up there is some 9 components in this unit including the gear, 2 roller bearings plus 6 fasteners and 4 small rare earth magnets.

The main body is brass together with the magnet disc. The remainder is in Delrin, an insulating material.

The operation of the unit is that the rotor arm is driven past the 4 spark plug contactors with the high voltage being supplied from a transistor unit, in this case a 6-volt Capacitor Discharge Ignition [CDI] unit. This was a purchased item which delivers a very healthy spark.

The device for triggering the spark [could be called the points] is by a Hall sensor over which a South pole magnet is passed over the Hall unit. The Hall unit is roughly 4 x 3 mm with 3 wire connectors.

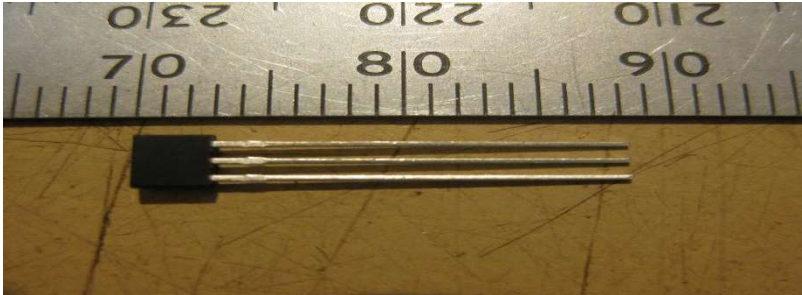
The 4 magnets in my case are 2mm in diam.

A major problem with the Hall sensors is failures due to **lack of complete circuitry [earthing]** during the rotor rotation. Stray sparking within the distributor body could also cause a blown Hall unit, combined with contacts of the 5 distributor connections and the 4 spark plug attachments there are number of potential problem areas.

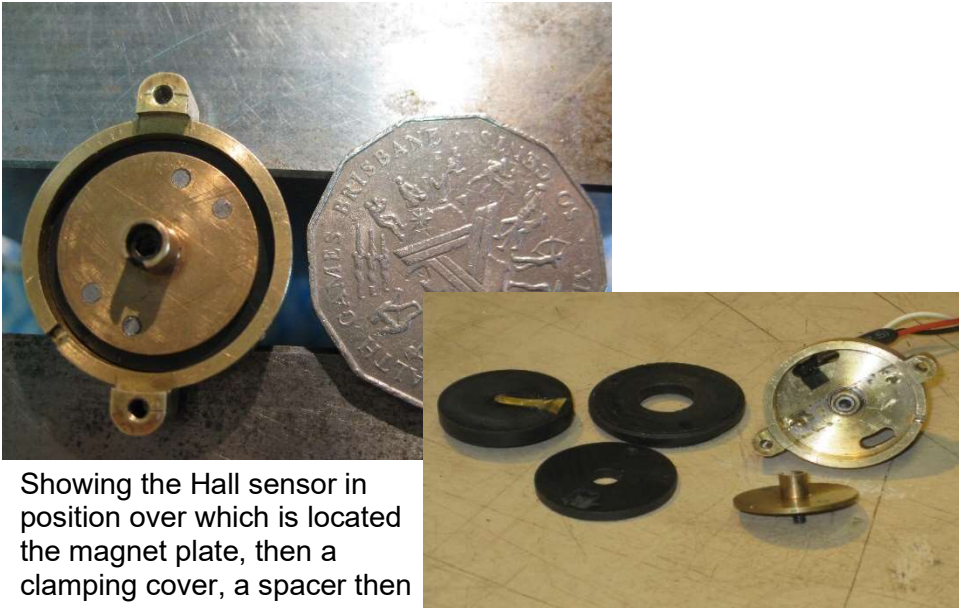
I have spent the last four months playing about with the ignition side of this engine. There have been moments when all the planets align and

the engine fires up only to stop due to Hall failure. Replacement requires soldering of 3 wires, [power, earth and signal] and re-timing both the engine and the distributor. Plus, the replacement cost of the Hall unit [I buy these in bulk!]

Currently I am using liquid electrical insulation paste to combat any live wire exposure plus 3 earthing contacts. Engine frame, the CDI unit plus an earth direct into the Hall earth link. All to battery negative Looking at a number of IC engine forums Hall failure is mentioned a lot. Hopefully I may be able to respond with a positive fix.



Above is a Hall sensor. 3 wire connectors. Power. Earth & Signal. Below shows the 4 magnets which rotate over the Hall sensor. Note irregular magnet spacing due to 90-degree V engine layout.

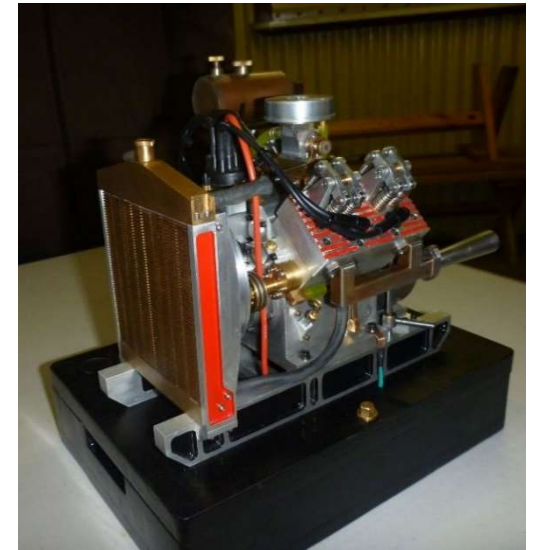


Showing the Hall sensor in position over which is located the magnet plate, then a clamping cover, a spacer then

the rotor which is keyed to the magnet plate.



The distributor cap with leads

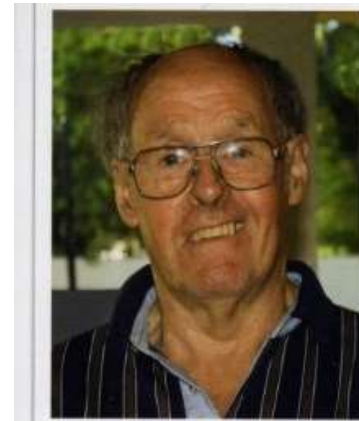


The completed engine

SASMEE BUSINESS

Vale Ralph Ollerenshaw

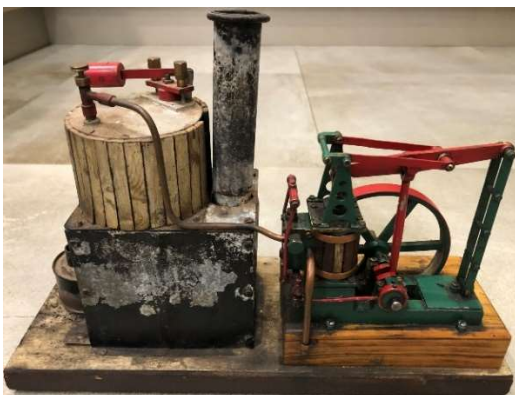
Ralph was born in the UK in 1937. He migrated with his family to Australia when he was eleven years old. Settling first in Sydney, he became an apprentice fitter. Ralph was a keen glider pilot and a friend of the Heysen trail, completing the entire trek in two years. His working career included going to sea as a marine engineer and working on the Accolade. Ralph joined SASMEE in 1999 and for many years attended to the wood fired boiler that powers the Steam House. He also served on the committee of SASMEE including acting as Treasurer. His ever willing participation and his dry wit are sadly missed.



Ralph

Help Wanted

Craig Potter of Glandore has asked for help in restoring this engine made by close friend. He is happy to do a lot of the work himself but needs support and advice when it comes to rebuilding the engine and some of the boiler work, particularly the plumbing. The engine has been run but now does not run smoothly.



The scope of work required would be:

- Pull down the engine. Examine, clean and paint components and reassemble. Craig can do the cleaning and painting of the engine components under instruction.
- Fashion and plumb a new boiler. A lot of help needed here.
- Make a new, or restore the existing boiler housing chimney. Craig is capable of this, but the structure will depend on suggestions/dimensions for the new boiler.
- Make a new mounting base for both the boiler and the engine. Craig can do this, but considering the boiler work and the dismantling/reassembling of the engine, it need not be the same dimensions or configuration.

It is the pulling down and rebuilding of the engine and the making and plumbing of the boiler that I need the help with.

Max

Up and Running

Public Run Day 6th September

7 1/4"	Conway	Steam	Dylan O'Sullivan
	U33	Petrol	Jeremy Kemp
	350	Electric	Kyle Delaney-Carter
	44 De Winton	Steam	Jake Barber
5"	Speedy	Steam	Allan Wallace
	SAR 509	Steam	John Mere
	NSU 57	Electric	Kingsley Martin
Boats	Cranborne	Electric	Bob Smith
	Georgina	Sail	Bob Smith
	US Centery	Electric	Phillip Green
	Medea	Electric	Phillip Green
	Skimmer	Electric	Jeff During
	Spurt	Electric	Jeff During

Public Run Day 19th September

7 1/4"	Conway	Steam	Dylan O'Sullivan
	U33	Petrol	Jake Barber
	44 De Winton	Steam	Cameron Dicker
5"	Speedy	Steam	Allan Wallace
	Jumbuck	Electric	Len Redway
	Arayalla	Electric	Bryan Homann
	NSU 57	Electric	Kingsley Martin
Boats	Pride of Firth	Electric	Bob Smith
	Dolphin	Electric	Michael Priest
	Skimmer	Electric	Jeff During
	Spurt	Electric	Jeff During
	Stiletto	Electric	Michael Offler

Public Run Day 17th October

7 1/4"	Conway	Steam	Dylan O'Sullivan
	U33	Petrol	Jeremy Kemp
	LNER K1	Steam	Jack Soames
	350	Electric	Kyle Delaney-Carter
5"	5073	Steam	Allan Wallace
	Sweet Pea	Steam	John Lyas
	Cresley	Steam	Simon Lindsay
	NSU 57	Electric	Kingsley Martin

	422	Electric	Malcolm Ambler
Boats	Coal Island	Electric	Michael Priest
	Skimmer	Electric	Jeff During
	Spurt	Electric	Jeff During
	LK 57	Electric	Michael Offler
	Selina	Electric	Robert Ball

General Meetings were held on 8th September and 13th October in the Bowling Club.

Annual Show and Tell

Because we cannot meet at the SASMEE club rooms, we will now hold the annual Show and Tell at the Christmas club run day. Nominally between 2:00 and 4:00 in the afternoon. This run day is scheduled for Saturday 19th December. The Show and Tell is always a highlight of the year, so bring along all your work, no matter at what stage it is, to share with other members.

Reminders!!

Covid Hygiene Training Online

A reminder, please complete the Covid Training and Covid Marshal Training. Without enough trained volunteers, we cannot continue to run.

Working with Children

And for those who still haven't undertaken their "Working with Children" clearances, these are still necessary, so please get on the case.

Loading of Trains.

SASMEE Regulation 9 – Public field Day Procedures, states:

"Children riding on trains are to be accompanied by at least one parent or guardian. The carriage of babies strapped in front or back carriage devices by adults (commonly called "papooses") is not allowed. All children must be able to be seated on riding car seats with legs straddling the seat."

While there has been some discussion on changing the procedure, this is the current rule and it must be adhered to. There is no room for relaxation.

Smoke

There have been a number of complaints regarding the excessive amount of smoke being emitted by some locomotives. These complaints have come not only from our visitors but also from the croquet club next door. Drivers are advised and asked to keep smoke emissions to an absolute minimum. If you are having trouble controlling smoke emissions, John Mere, Brenton Dicker and Allan Wallace are available to offer advice and help. Please take up the

opportunity. We don't not want any formal complaints that may curtail our activities.

Club Records

At each run day, the Safety Office gets each train and boat operator to record the locomotive/boat for the day. As well as the necessary requirement for the safe operation, these records are the source of information for the Bulletin.

That being the case, could you please go that extra yard – and write legibly.

Silver Tears.

A couple of Bulletins ago I put in an article about the locomotive I'm building. Well, the time come for the purchase of silver solder. After extensive research and discussion, bought some from interstate. The landed price in Adelaide was \$800 per kilogram.

The irony was that the same week in which the silver solder was ordered, we bought a new washing machine. An all singing, all dancing reputable brand, delivered, installed and the old one removed - \$1500. Less than the price of two kilograms of silver solder!